

CLAIMS

1. A polyester composite thick-and-thin multifilament yarn comprising:

(A) a polyester thick-and-thin multifilament yarn comprising a plurality of polyester individual thick-and-thin filaments each having a plurality of thick portions and a plurality of thin portions alternately arranged with each other along the longitudinal axis of each individual filament; and

(B) a polyester multifilament yarn having a higher dyeability than that of the thick-and-thin multifilament-yarn (A) and comprising a plurality of polyester individual filaments each having a thickness which is substantially uniform along the longitudinal axis of each individual filament; combined and interlaced with the polyester thick-and-thin multifilament yarn (A), to form a composite thick-and-thin yarn, wherein

(a) in each of the composite thick portions of the composite thick-and-thin yarn, portions of the plurality of individual filaments in the multifilament yarn (B) are distributed substantially in a center part of the composite thick portion of the composite yarn, to form a core part, and the thick portions of the plurality of the individual thick-and-thin filaments in the thick-and-thin multifilament yarn (A) are distributed around the core part, to form a sheath part, and to thereby constitute a core-in-sheath structure in the composite thick portion; and

(b) in each of the composite thin portions of the composite thick-and-thin yarn, thin portions of the plurality of individual thick-and-thin filaments in the thick-and-thin multifilament yarn (A) and portions of the plurality of individual filaments in the multifilament yarn (B) are distributed in a random mixture with each other.

2. The polyester composite thick-and-thin yarn as claimed in claim 1, wherein a ratio of a total length of

the composite thick portions (a) contained in the composite thick-and-thin yarn to the length of the composite thick-and-thin yarn is in the range of from 40 to 90%.

5           3.    The polyester composite thick-and-thin yarn as claimed in claim 1, wherein a yarn length difference percentage between the polyester multifilament thick-and-thin yarn (A) and the polyester multifilament yarn (B), as defined by the equation (1):

10           Yarn length difference percentage (%)  
            
$$= (L_s - L_c) / L_c \times 100 \quad (1)$$

            in which equation (1),  $L_s$  represents an average length of the individual filaments contained in the polyester thick-and-thin multifilament yarn (A) and  
15            $L_c$  represent an average length of the individual filaments contained in the polyester multifilament yarn (B), the average filament lengths  $L_s$  and  $L_c$  being determined in accordance with JIS L 1015-1998, 7.4.1 (3) method,

20                           is in the range of from 5 to 15%.

            4.    The polyester composite thick-and-thin yarn as claimed in claim 1, wherein the polyester multifilament yarn (B) is dyeable by cationic dyes.

            5.    A process for producing the polyester composite  
25           thick-and-thin yarn as claimed in any one of claims 1 to 4, comprising the steps of:

            laying parallel a polyester thick-and-thin multifilament yarn (Aa) which comprises a plurality of polyester individual filaments each having thick portions and thin portions alternately arranged with each other  
30           along the longitudinal axis of the each individual filament, and has an ultimate elongation of 80 to 150% and a shrinkage in boiling water of 30 to 60%, and a polyester multifilament yarn (Ba) which comprises a  
35           plurality of polyester individual filaments having a thickness substantially uniform along the longitudinal direction of the polyester individual filaments, exhibits

a higher dyeability than that of the polyester thick-and-thin multifilament yarn (Aa) and has an ultimate elongation of 20 to 70% and a shrinkage in boiling water of 10 to 20%, to each other;

5                   subjecting the paralleled composite yarn to a mixing and interlacing procedure under an air jetting pressure of 30 to 600 kPa at a processing speed of 200 to 800 m/min.; and

                  heat-treating the mixed and interlaced  
10 composite yarn at an overfeed rate of 0.5 to 3.0% at a heating temperature of 150 to 230°C.

6. A woven or knitted fabric comprising the polyester composite thick-and-thin yarns as claimed in any one of claims 1 to 4.

15           7. The woven or knitted fabric as claimed in claim 6, wherein a width ratio  $W_1/W_2$  of an apparent largest width  $W_1$  to an apparent smallest width  $W_2$  of the polyester composite thick-and-thin yarns contained in the woven or knitted fabric is in the range of from 1.1 to  
20 1.7.

8. The woven or knitted fabric as claimed in claim 6, further processed by a mass-reduction treatment with an alkali, which alkali-treated woven or knitted fabric has a plurality of cracks formed on the peripheral  
25 surfaces of the thick portions of the plurality of polyester individual thick-and-thin filaments contained in the polyester composite thick-and-thin yarn.

9. The woven or knitted fabric as claimed in claim 6, further processed by a mass-reduction treatment with an alkali, in which alkali-treated woven or knitted  
30 fabric, a width ratio  $W'_1/W'_2$  of an apparent largest width  $W'_1$  to an apparent smallest width  $W'_2$  of the polyester composite thick-and-thin yarns contained in the fabric, is in the range of from 1.1 to 1.7, and a  
35 plurality of cracks, each extending in a direction intersecting the longitudinal axis of the individual thick-and-thin filaments, are formed on peripheral

surfaces of the thick portions of the plurality of polyester individual thick-and-thin filaments in the polyester composite thick-and-thin yarn.